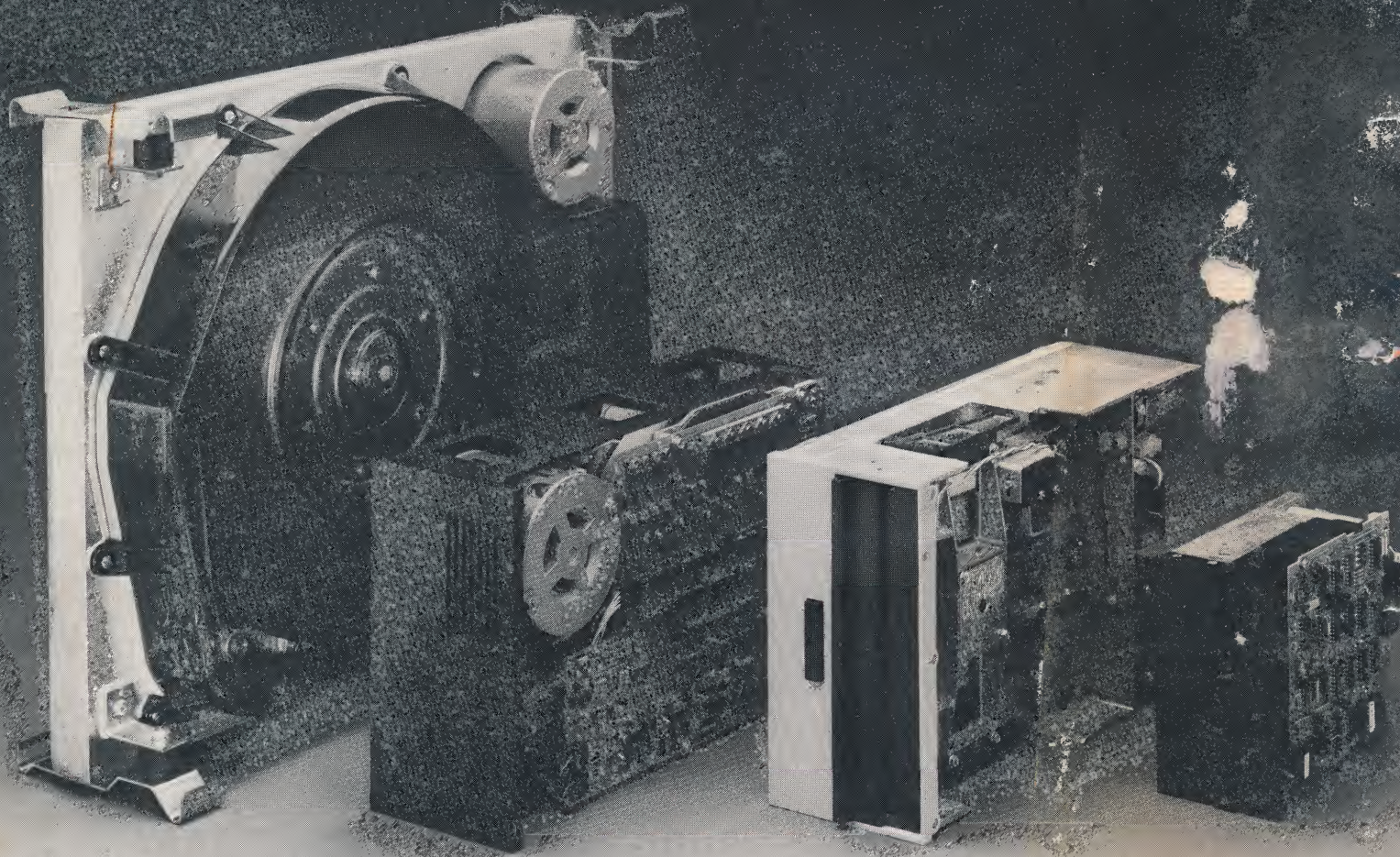


# The Headstrong Product Family



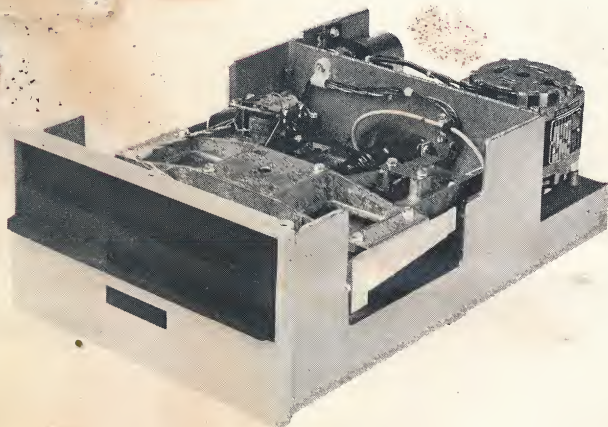
 Shugart

Mar 80



# SA801/801R

## Diskette Storage Drives



Shugart's SA801 and SA801R 8-inch floppy disk drives provide both single and double density operation. The SA801R floppy disk drive is mechanically and electronically the same as the SA800/801 except that the SA801R has a narrower chassis width plus side and bottom mounting posts to facilitate installation of two drives side-by-side in a standard 19" RETMA rack.

### Features:

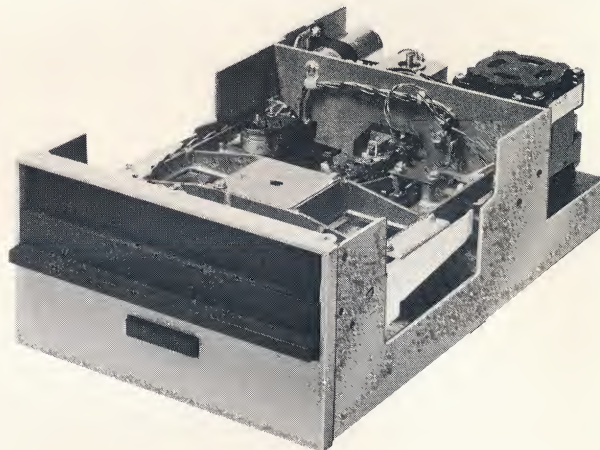
- Bottom and side mounting holes for ease of installation (SA800R/801R).
- Single and double density capability.
- Proprietary ceramic R/W head designed and manufactured by Shugart.
- Side-by-side mounting in standard 19" RETMA rack (SA800R/801R).
- Die cast cartridge guide and base plate.
- Positive diskette clamping registration.
- Pop-out diskette retrieval.
- Flexible interface with multiplex capability.

### Key Specifications

Capacity	Single/Double Density
Unformatted	
Per Disk	400/800 kilobytes
Per Surface	5.2/10.4 kilobytes
Per Track	
Heads	1
Access Time	
Track-to-Track	8 ms
Average (including settling)	211 ms
Transfer Rate	250/500 kilobits/sec.
Recording Density (inside track)	3200/6400 bpi
Flux Density	6400 fci
Mechanical Dimensions (exclusive of front panel)	
Height	= 4.62 in. (117 mm)
Width	= 9.50 in. (241 mm)
	8.55 in. (217 mm) rack
Depth	= 14.25 in. (362 mm)
Weight	= 13.0 lbs. (5.91 kg)
Media Size:	8 in. sq. envelope

# SA851/851R

## Double-Sided Diskette Storage Drives



The SA851 diskette storage drive is the enhanced double-headed version of the standard Shugart SA801 drive. The SA851 drive provides up to four times the on-line storage capacity, faster access time, and lower heat dissipation.

### Features:

- Storage capacity of up to four times that of SA801 and other standard floppy drives.
- Single and double density capability.
- Same physical size as standard SA800/801 product family.
- SA800/801 I/O compatibility.
- Reads and writes data on any standard diskette (single-sided) as well as the IBM Diskette 2, 2D or equivalent.
- Improved access time over standard drives—3 ms track-to-track.
- New proprietary Fasflex™ actuator.
- State of the art R/W head technology.
- Write protect and programmable door lock are standard for improved data security.

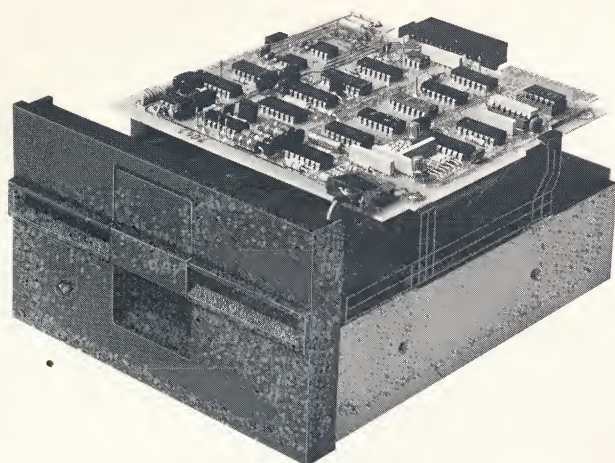
### Key Specifications

Capacity	Single/Double Density
Unformatted	
Per Disk	800/1600 kilobytes
Per Surface	400/800 kilobytes
Per Track	5.2/10.4 kilobytes
Heads	2
Access Time	
Track-to-Track	3 ms
Average (including settling)	91 ms
Transfer Rate	250/500 kilobits/sec.
Recording Density (inside track)	3408/6816 bpi
Flux Density	6816 fci
Mechanical Dimensions (exclusive of front panel)	
Height	= 4.62 in. (117 mm)
Width	= 9.50 in. (241 mm)
	8.55 in. (217 mm) rack
Depth	= 14.25 in. (362 mm)
Weight	= 13.0 lbs. (5.91 kg)
Media Size	8 in. sq. envelope



# SA400

## Minifloppy™ Disk Drive



The compact SA400 Minifloppy disk drive offers a reliable, low cost, high performance alternative to OEM data storage applications. The Minifloppy drive occupies one-fourth the space of Shugart's standard SA801 floppy disk drive, fitting comfortably in the space allocated for most cassette units.

### Features

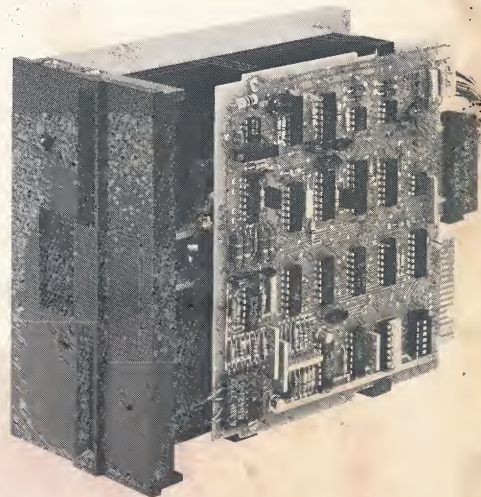
- Compact size and low weight.
- Single and double density capability.
- 110/220 Kbyte (unformatted) storage capacity.
- 125/250 Kbits/second transfer rate.
- Low heat dissipation (13.3 watts or less).
- Positive media insertion to avoid media damage.
- DC drive motor (eliminates AC requirements).
- Proprietary R/W head designed and manufactured by Shugart.
- Write protect circuitry.
- Activity light.

### Key Specifications

Capacity	Single/Double Density
Unformatted	
Per Disk	109.4/218.8 kilobytes
Per Track	3.1/6.2 kilobytes
Heads	1
Access Time	
Track-to-Track	25 ms
Average (including settling)	298 ms
Transfer Rate	125/250 kilobits/sec.
Recording Density (inside track)	2581/5162 bpi
Flux Density	5162 fci
Mechanical Dimensions	
(exclusive of front panel)	
Width =	5.75 in. (146.1 mm)
Height =	3.25 in. (82.6 mm)
Depth =	8.0 in. (203.2 mm)
Weight =	3 lbs. (1.36 kg)
Media Size	5.25 in. sq. envelope

# SA450

## Double-Sided, Double Density Minifloppy™



The SA450 Minifloppy drive is the same size as Shugart's SA400, but provides up to twice the on-line capacity. In addition, this enhanced double-headed version of the Minifloppy provides fast access time and low heat dissipation.

### Features

- Compact size and low weight.
- SA400 I/O compatibility.
- 125/250 Kbits/second transfer rate.
- Single or double density capability.
- Low heat dissipation.
- Positive media insertion to avoid media damage.
- DC drive motor (eliminates AC requirements).
- State-of-the-art R/W head technology.
- Reads and writes on any single or double sided mini-diskette.
- Dual R/W heads access both sides of the diskette, eliminating the head load pad.
- Write protect circuitry.
- Activity light.

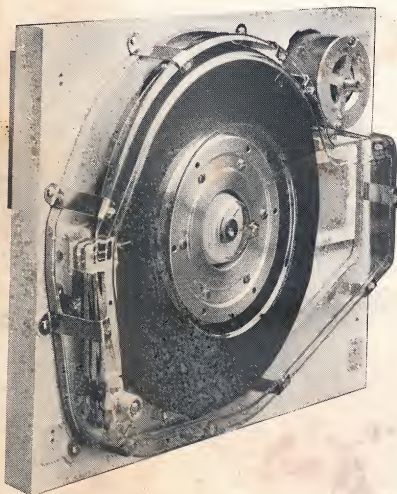
### Key Specifications

Capacity	Single/Double Density
Unformatted	
Per Disk	218.8/437.5 kilobytes
Per Surface	109.4/218.8 kilobytes
Per Track	3.1/6.2 kilobytes
Heads	2
Access Time	
Track-to-Track	25 ms
Average (including settling)	298 ms
Transfer Rate	125/250 kilobits/sec.
Recording Density (inside track)	2728/5456 bpi
Flux Density	5456 fci
Mechanical Dimensions	
(exclusive of front panel)	
Width =	5.75 in. (146.1 mm)
Height =	3.25 in. (82.6 mm)
Depth =	8.0 in. (203.2 mm)
Weight =	3 lbs. (1.36 kg)
Media Size	5.25 in. sq. envelope



# SA4000

## Fixed Disk Drive



SA4000 Series of 14-inch fixed disk drives are compact, low cost drives utilizing highly reliable Winchester head and media technology. They offer the lowest cost per Megabyte storage capability in their capacity range.

### Features

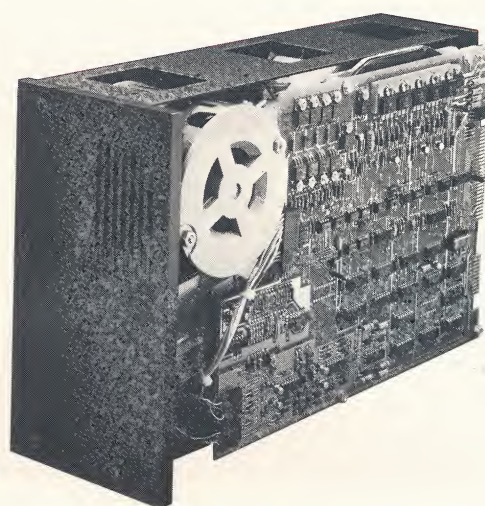
- Winchester head and media technology.
- Compact —19-inch RETMA rack mountable using only 5.25 inch panel space.
- Low weight (35 lbs.).
- Low heat dissipation (200 watts typical).
- 7.1 Mbits/second transfer rate.
- Optional head-per-track storage—144 Kbytes (unformatted).
- Fully enclosed drive mechanism.
- Proprietary Fasflex II™ band actuator.

### Key Specifications

Unformatted	4004/4008
Per Drive	14.5/29.0 Megabytes
Per Surface	7.3 Megabytes
Per Track	18 kilobytes
Heads	4/8
Access Time	
Track-to-Track	20 ms
Average	65 ms
Maximum	140 ms
Transfer Rate	889/kilobytes/sec.
Recording Density	5534 bpi
Flux Density	5534 fci
Mechanical Dimensions (exclusive of front panel)	
Height	= 5.22 in. (132.6 mm)
Width	= 16.6 in. (421.6 mm)
Depth	= 21.9 in. (556.3 mm)
Weight	= 35 lbs. (15.9 kg)
Media Size	14 in.

# SA1000

## Fixed Disk Drive



The SA1000 Series of low cost 8-inch fixed disk drives offers OEM's proven Winchester fixed disk technology in a package that is the same physical size as the Shugart 8-inch floppy disk drives.

### Features

- Identical mounting to either rack mounted or standard Shugart 8-inch floppy drives.
- Lowest cost/ Megabyte 8-inch drive in its capacity range.
- Winchester head and media technology.
- Proprietary Fasflex III™ band actuator.
- 4.34 Mbits/second transfer rate.
- Simple interface similar to floppy.
- Same DC voltages as Shugart's 8-inch floppies.
- Optional data separator PCB available.
- Optional controller PCB available.

### Key Specifications

Unformatted	1002/1004
Per Drive	5.33/10.67 Megabytes
Per Surface	2.67 Megabytes
Per Track	10.4 kilobytes
Heads	2/4
Access Time	
Track to Track	19 msec
Average	70 msec
Maximum	150 msec
Transfer Rate	4.34 Megabits/sec.
Recording Density	6270 bpi
Flux Density	6270 fci
Mechanical Dimensions (same as SA850R)	
Height	= 4.62 in. (117.3 mm)
Width	= 8.55 in. (217.2 mm)
Depth	= 14.25 in. (362.0 mm)
Weight	= 17 lbs. (7.7 kg)
Media Size	8 in.



# Comparative Detailed Specifications For All Shugart Disk Drives

## Floppy Disk Drives

SA801	SA851	SA400	SA450
Single/Double Density	Single/Double Density	Single/Double Density	Single/Double Density

### Performance

Capacity				
Unformatted				
Per Drive				
Per Disk	400/800 KB	800/1600 KB	109.4/218.8 KB	218.8/437.5 KB
Per Surface	400/800 KB	400/800 KB	109.4/218.8 KB	109.4/218.8 KB
Formatted				
Per Drive				
Per Disk	250/500 KB	606/1212 KB	89.6/179.2 KB	179.2/358.4 KB
Per Surface	250 KB	303/606 KB	89.6/179.2 KB	89.6/179.2 KB
Per Track	3.3 KB	4.1/8.2 KB	2.6/5.1 KB	2.6/5.1 KB
Per Sector	128/256 Bytes	128/256 Bytes	256/512 Bytes	256/512 Bytes
Sector/Track	26	32	10	10
Transfer Rate	250/500 Kbits/sec.	250/500 Kbits/sec.	125/250 Kbits/sec.	125/250 Kbits/sec.
Access Time				
Track-to-track	8 ms	3 ms	25 ms	25 ms
Average	211 ms	91 ms	298 ms	298 ms
Settling Time	8 ms	15 ms	15 ms	15 ms
Head Load Time	35 ms	35 ms	50 ms	
Average Latency	83 ms	83 ms	100 ms	100 ms

### Functional

Rotational Speed	360 rpm	360 rpm	300 rpm	300 rpm
Recording Density	3200/6400 bpi	3408/6816 bpi	2581/5162 bpi	2728/5456 bpi
(Inside track)				
Flux Density	6400 fci	6816 fci	5162 fci	5456 fci
Track Density	48 tpi	48 tpi	48 tpi	48 tpi
Cylinders		77		70
Tracks	77	154	35	35
R/W Heads	1	2	1	2
Disks				
Encoding Method	FM/MFM/M <sup>2</sup> FM	FM/MFM/M <sup>2</sup> FM	FM/MFM	M/MFM

### Physical

Environmental Limits				
Ambient Temperature		40° to 115°F (4.4°C to 46.1°C)		
Relative Humidity		20% to 80%		
Maximum Wet Bulb		78% non-condensing (25.6°C)		
AC Power Requirements	50/60 Hz ± 0.5 Hz			
	110/115 VAC Installations = 85-127V at .4A typical			
	200/230 VAC Installations = 170-253V at .2A typical			

DC Voltage Requirements	+ 24 VDC ±5% 1.3A typical	+ 24 VDC ±10% 0.6A typical	+ 12 V ±5% @ 0.9A typical	+ 12 V ±5% @ 0.8A typical
	+ 5 VDC ± 5% 0.8A typical	+ 5 VDC ±5% 0.8A typical	+ 5 V ±5% @ 0.5A typical	+ 5 V ±5% @ 0.5A typical
	- 5 VDC ±5% .05A typical	- 7 to - 16 VDC 0.7A typical		
	(option - 7 to - 16 VDC)	(option - 5 VDC ±5% 0.5A typ.)		

Mechanical Dimensions				
Height	4.62 in. (117 mm)	4.62 in. (117 mm)	3.25 in. (82.6 mm)	3.25 in. (82.6 mm)
Width	8.55 in. (217 mm) rack	8.55 in. (217 mm) rack	5.75 in. (146.1 mm)	5.75 in. (146.1 mm)
	9.50 in. (241 mm)	9.50 in. (241 mm)		
Depth	14.25 in. (362 mm)	14.25 in. (362 mm)	8.0 in. (203.2 mm)	8.0 in. (203.2 mm)
Weight	13 lbs. (5.9 Kg)	13 lbs. (5.9 Kg)	3 lbs. (1.36 Kg)	3 lbs. (1.36 Kg)
Heat Dissipation	271 BTU/Hr. (80 watts)	195 BTU/Hr. (57 watts)	45 BTU/Hr. (13 watts) cont. 25 BTU/Hr. (7.3 watts) standby	42 BTU/Hr. (12.1 watts) cont. 25 BTU/Hr. (7.3 watts) standby

### Reliability

MTBF			8000 POH under typical usage	
PM	12 months		Not required	Not required
MTTR	30 min.	30 min.	30 min.	30 min.
Component Life	5 years	5 years	5 years	5 years
Error Rates				
Soft Read	1 per 10 <sup>9</sup> bits read	1 per 10 <sup>9</sup> bits read	1 per 10 <sup>8</sup> bits read	1 per 10 <sup>9</sup> bits read
Hard Read	1 per 10 <sup>12</sup> bits read	1 per 10 <sup>12</sup> bits read	1 per 10 <sup>11</sup> bits read	1 per 10 <sup>12</sup> bits read
Seek Errors	1 per 10 <sup>6</sup> seeks	1 per 10 <sup>6</sup> seeks	1 per 10 <sup>6</sup> seeks	1 per 10 <sup>6</sup> seeks



## Fixed Disk Drives

### SA4004/4008

### SA1002/1004

14.5/29 MB  
14.5 MB  
7.3 MB

5.33/10.67 MB  
5.33 MB  
2.67 MB

12.4/24.8 MB  
12.4 MB  
6.2 MB  
15.4 KB  
256 Bytes  
60  
7.1 Mbits/sec.

4.2/8.4 MB  
4.2 MB  
2.1 MB  
8.2 KB  
256 Bytes  
32  
4.34 Mbits/sec.

20 ms  
65 ms

19 ms  
70 ms

10.1 ms

9.6 ms

2964 rpm  
5534 bpi

3125 rpm  
6270 bpi

5534 fci  
172 tpi  
202  
808/1616  
4/8  
1/2  
MFM

6270 fci  
172 tpi  
256  
512/1024  
2/4  
1/2  
MFM

50°-105° (10°-41°C)  
8% to 10%

50°-115°F (10°-46°C)  
8% to 80%

50/60 Hz ±0.5 Hz  
100/115 VAC Installations  
90-127 V at 1.5A typical  
200/230 VAC Installations  
180-253 V at .8A typical  
+24 VDC ±10% 2.5A typical  
+5 VDC ±5% @ 2.5A typical  
-5 VDC ±5%  
(Opt. -7 to -16 VDC)  
0.1A typical

50/60 Hz ±0.5 Hz  
100/115 VAC Installations  
90-127 V at 1.1A typical  
200/230 VAC Installations  
180-253 V at 0.6A typical  
+24 VDC ±10% 2.8A typical  
during stepping  
(0.2A typical steady state)  
+5 VDC ±5% 3.6A typical  
-5 VDC ±5%  
(Opt. -7 to -16 VDC)  
0.2A typical

5.22 in. (132.6 mm)  
16.6 in. (421.6 mm)

4.62 in. (117 mm)  
8.55 in. (217 mm)

21.9 in. (556.3 mm)  
35 lbs. (15.9 Kg)

14.25 in. (362.0 mm)  
17 lbs. (7.7 Kg)

682 BTU/Hr. (200 watts)

511 BTU/Hr. (150 watts)

Not required

Not required

30 min.  
5 years

30 min.  
5 years

1 per 10<sup>10</sup> bits read  
1 per 10<sup>12</sup> bits read  
1 per 10<sup>6</sup> seeks

1 per 10<sup>10</sup> bits read  
1 per 10<sup>12</sup> bits read  
1 per 10<sup>6</sup> seeks

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